

Appln. No.: 10/001,421  
Amendment Dated October 24, 2003  
Reply to Office Action of September 10, 2003

END919970013US2

**Amendments to the Claims:** This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1.-10. (Cancelled)

11. (Currently Amended) An intermediate interconnect structure for a semiconductor chip comprising:

a nonreflowed solder assembly including:

a Pb-rich ball attached to said semiconductor chip and having an exposed surface; and

a thin cap layer of Sn on said exposed surface of said Pb-rich ball;

said Sn layer ~~being sufficiently thin~~ having a thickness of less than 10.2 $\mu$ m (0.4 mils) and having a melting temperature lower than that of Pb so that Sn from said thin layer and Pb from said ball are diffused and intermixed after reflowing and annealing to form ~~[[an]]~~ a solder assembly having a weight composition of about 97/3 Pb/Sn.

12.-14. (Cancelled)

15. (Withdrawn) A process of capping a Pb-rich ball with at least one layer of low melting point metal, said process comprising the steps of:

- a) forming said Pb-rich ball on a substrate;
- b) placing a mask over said Pb-rich ball such that a portion of said Pb-rich ball is exposed;
- c) depositing at least one layer of a low melting point metal over said Pb-rich ball through said mask, such that at least a portion of said Pb-rich ball has a capping layer of said low melting point metal;
- d) heating said Pb-rich ball and said capping layer of said low melting point metal to form a eutectic alloy having a Pb-rich core and a cap region of said low melting point metal;

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e) annealing said eutectic alloy such that one of said low melting point metal from said cap region is diffused into said Pb-rich core and Pb from said Pb-rich core is diffused into a low melting point metal from said cap region,

wherein the melting point of said low melting point metal is lower than the melting point of Pb.

16. (Withdrawn) The process of claim 15, wherein said low melting point metal is Sn.
17. (Withdrawn) The process of claim 16, wherein substantially all of the Sn is diffused into said Pb-rich core to form an assembly having a weight composition of about 97/3 Pb/Sn.
18. (Withdrawn) The process of claim 17, wherein the step of annealing is performed at 150°C for a time in the range between 4 and 5 hours.
19. (Withdrawn) The process of claim 15, wherein said capping layer of said low melting point metal has a thickness of less than 10.2  $\mu\text{m}$  (0.4 mils).